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July 16, 2012

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Dear Chip and Kristine:

This letter provides **NOAA's comments on the Portland Harbor Superfund Site Feasibility Study (Draft)**. The March 30, 2012 document, hereafter referred to as the "draft FS", was prepared by Anchor QEA, LLC, Windward Environmental, LLC, Kennedy/Jenks Consultants, and Integral Consulting, Inc. for the Lower Willamette Group (LWG).

NOAA appreciates the opportunity to provide comments on this draft FS, the production of which obviously required a tremendous amount of effort on the part of LWG and its consultants.

NOAA did not conduct a comprehensive review of this document. Rather, we focused primarily on Section 6 (*Identification and Screening of Remedial Technologies*) and on other aspects of the report with significant implications for NOAA trust resources. Comments provided herein are reflective of NOAA's concerns from both an Endangered Species Act (ESA) and a Natural Resource Damages perspective. Comments can generally be characterized as 1) general/major relating to multiple parts of the document and 2) specific, primarily to section 6. NOAA staff involved in the review of this document, included among others, myself, Jessica Winter of the NOAA Office of Response and Restoration and Genevieve Angle of the NOAA National Marine Fisheries Service Habitat Conservation Division.

#### *General Comments*

**Monitored Natural Recovery (MNR):** Predictions in the draft FS are for successful monitored natural recovery throughout most of the Portland Harbor Superfund Site (hereafter referred to



as “the Site”). The LWG has stated that multiple lines of evidence point to the validity of MNR for the vast majority of the Site, but they are apparently unable to explain why high levels of surface contamination remain in many areas where releases occurred decades ago. Any model that cannot account for this should not be used for natural recovery predictions on this scale and with this level of importance for the selection of a clean-up alternative. The whole conceptual site model relies heavily on uncertain levels of natural recovery.

In addition, in describing the process options and analyzing the alternatives, there is no reason to lump enhanced MNR (EMNR) and in situ treatment (meaning carbon amendment) together, as these methods can and likely will be done independently of each other.

*Surface Weighted Area Concentrations (SWACs):* On the use of site-wide SWACs to claim that all alternatives are equally protective: it is explicitly evident that exposure scenarios exist at spatial extents that are smaller – in some cases significantly smaller – than the entire study area. Therefore NOAA disagrees with the LWG’s claim that all alternatives (B-F) meet the Environmental Protection Agency’s (EPA) criteria, because site-wide SWACs are not appropriate cleanup criteria at this site. In addition, the use of SWACs to achieve remedial goals allows substantial spatial areas with higher and potentially problematic levels of contamination to be masked by areas with lower contamination, the latter constituting a relatively extensive portion of the study area.

Risk calculations are conducted on a river mile SWAC basis. The data should not be averaged over an entire river mile: because the navigation channel effectively divides the 2 sides of the river into separate habitats, these should be assessed separately. So there should be at least three assessment areas per river mile: the left bank, the right bank, and the deep navigation channel. With respect to ESA-listed salmonids that utilize the Site, NOAA encourages EPA to ensure that remedial actions achieve reductions in contaminant concentrations on a suitable and appropriate spatial scale. NOAA anticipates that the draft *Regional Sediment Evaluation Framework* (2009), an interagency agreement currently under review, will provide screening levels for many of the contaminants in Portland Harbor that are protective of ESA listed salmonids. We are hopeful that this information, when it becomes available, will be useful to EPA and its partners for remedial decision making purposes.

*Use of Mean Quotients:* The mean quotient approach to risk assessment is too weak. There should be a “do not exceed” value for individual chemical hazard quotients so that a high risk from a single chemical is not masked by low results for other chemicals.

*Dredging:* The LWG applies numerous assumptions regarding the use of remedial dredging actions that introduce biases against dredging alternatives. These biases tend to portray the more dredging-intensive alternatives as far less desirable than actually may be the case.

- For example, the draft FS assumes that no in-water remedial actions can occur outside of the in-water work window. However, this is not necessarily the case. NOAA would support such actions so long as isolation management measures could be implemented in the work area to prevent or substantially reduce salmonid exposures to contaminants.
- The draft FS apparently also assumes that dredging technologies would be limited to mechanical dredges, though other dredge technologies could also be utilized where appropriate. For example, in some areas of the Site, hydraulic dredging would be faster and result in fewer and/or reduced contaminant releases.
- The draft FS also relies on the assumption that dredging operations would be limited to reliance on three simultaneously operating dredge plants, an assumption that seems arbitrary and overly conservative.
- Finally, the sequencing of the dredging in the draft FS alternatives does not seem logical in some cases: some of the graphs do not depict large reductions in contaminant levels until many years after remediation begins. NOAA maintains that areas with higher contamination should be removed first to achieve such early reductions.

Taken cumulatively, these assumptions unrealistically increase the duration of many Site remedial alternatives, in particular those that rely more heavily on dredging actions. NOAA believes that a recalibration of these assumptions would introduce reasonable, cost-effective and practicable alternatives that would allow for the removal of larger volumes of more contaminated sediments, thereby producing more substantial reductions in ecological (and human health) risks.

*Containment Measures:* The LWG claims in the draft FS that contaminant containment measures such as silt curtains or sheet pile walls are unsuccessful because a small amount of contamination still escapes when such methods are utilized. However, contaminants were successfully contained during the removal action at Gasco several years ago. (NOAA provides additional comments on containment measures on pages 7-8 of this correspondence.)

*Confined Disposal Facilities (CDFs) and Confined Aquatic Disposal Cells (CADs):* NOAA has, over the years, consistently communicated to EPA our concerns regarding CDFs and CADs.

- CDFs and/or CADs could adversely impact or destroy substantial areas of critical habitat.

- CDFs and/or CADs could present a potential ongoing risk to ESA-listed and other species associated with the threat of chronic post-remedial action releases of toxic concentrations of contaminants. This becomes a long term problem, from an ESA standpoint, in that it may not or does not lead to recovery and has ongoing impacts to listed fish for the life of the project. While it may be possible (though difficult and very expensive) to mitigate for the CDF impacts, it is unclear to NOAA how one would mitigate (even off-site) for adverse effects to ESA-listed and other species resulting from exposure to CDF leachates over the life of the projects.

*ESA Consultation:* NOAA or the National Marine Fisheries Service does not anticipate conducting a programmatic ESA consultation on the remediation actions in Portland Harbor. Actions covered under programmatic consultations are typically of a repetitive nature with minor impacts and predictable outcomes. NOAA's current programmatic opinions specifically exclude Portland Harbor because the presence of contaminants at levels presenting unacceptable risks strongly suggests that minor impacts and predictable outcomes are unlikely. In addition, based on the proposed alternatives in the draft FS and our lack of confidence that certain aspects of the proposed alternatives will meet the needs of ESA-listed NOAA trust resources, NOAA will carefully review each individual proposed clean-up action in the harbor to ensure they are protective of said resources. Consequently, NOAA's *Biological Opinion* on EPA's Proposed Plan will not have an incidental take statement, and will defer to individual consultations on specific remedial actions. At this time, NOAA will not be reviewing or commenting on the preliminary draft site-wide *Biological Assessment* submitted by LWG.

*Mitigation:* It does not appear that NOAA's previous comments from the draft FS check-in (transmitted April 5, 2011) were incorporated into Appendix M of the draft FS. With respect to these comments, LWG should be reminded that mitigation under the Clean Water Act and ESA are not and one and the same. Furthermore, for ESA mitigation NOAA will not be considering mitigation at the scale of the 4<sup>th</sup> field Hydraulic Unit Code. Upper Willamette River (UWR) ESA-listed salmonid stocks or Lower Columbia River (LCR) ESA-listed salmonid stocks (or the specific impacted life stages of these stocks) could be omitted. Because mitigation will need to be provided for both UWR and LCR stocks impacted by any action that decreases habitat values in Portland Harbor, all such species and associated life stages (of the affected evolutionarily significant units/distinct population segments) must be taken into account when selecting mitigation sites. In addition, the location where the habitat degradation occurred will be heavily considered when deciding on the appropriate location for mitigation. Mitigation within the Site will be a priority for ESA purposes.

*Human Health vs. Ecological Risk:* NOAA notes that the draft FS focuses primarily on human health risks (particularly cancer risk). NOAA anticipates that, in many instances, appropriate remedial actions undertaken to address human health cancer risk will incidentally address, in whole or in part, risks to ecological receptors. However, to ensure ecological

risks are adequately addressed, NOAA encourages EPA to select (or develop, if necessary) remedial alternatives that result in clean-ups that are adequately protective of listed species (considering background levels) and other ecological receptors.

### *Specific Comments*

Sediment Trap Samples section, page 6-15: Note that onsite sediment trap polychlorinated biphenyls (PCB) data are well above the 5-20 ppb range shown in the offsite samples, and therefore some resuspension of onsite sources or ongoing sources is evident (i.e., this should not be used as evidence that MNR by itself will be successful).

Section 6.2.2.1.2, page 6-22: “These models have been EPA approved” is not an accurate statement and should be revised.

Section 6.2.2.1.3, page 6-22: In general, weight of evidence (WOE) approaches can be well-suited for evaluating the relative strengths and weaknesses of remedial alternatives, but only when inconsistencies between lines of evidence (LOE) are addressed and each LOE is assigned an appropriate weight and significance in the overall framework. In the case of the WOE analysis for MNR in the Site, NOAA has identified what we believe are some significant flaws that lead to overly optimistic predictions for MNR success. The following revisions should be made to produce a more reliable analysis:

- Future Maintenance Dredge areas should *all* be ranked as Category 1 (unlikely to recover) rather than assigning shallow-use areas to Category 2. Any dredging at all would be sufficient to disrupt MNR: it does not matter if the target final depth is 10 ft or 50 ft, it only matters how much is being taken off in a single dredging event.
- Net sedimentation rate (NSR) (page 6-25): “Areas within the uncertainty range of the surveys were assigned to Category 2”. This is not consistent with the description of Category 2, which states: “Category 2 was assigned to areas where a given LOE suggests that natural recovery will likely occur, but the degree of effectiveness is less certain.” This LOE does not suggest that natural recovery will “likely occur” if the surveys are not observing net sedimentation. Such areas should be Category 1.
- Surface/Subsurface concentration ratios: it is fine to use PCBs as a surrogate for screening purposes, but this should be verified to ensure that locations with ongoing sources of other contaminants are not left to MNR.
- “Areas where ... subsurface concentrations are within a factor of 1.5 of the [surface] concentrations... were assigned to Category 2.” As noted for the NSR LOE, this indicates that concentrations are approximately stable over time, thus recovery is not occurring, so such areas should be reclassified as Category 1.

- Model-predicted half-lives: using 10 and 20 years as cutoffs for half-lives is arbitrary and not justified. Rather than looking at half-lives, it would make more sense to look at time to meet target concentrations. NOAA understands that the model has already been run for this question. If it is too complex to do this for all contaminants, then an alternative would be to use PCBs as a surrogate as was done for the surface/subsurface concentration ratios.

Section 6.2.2.1.3, page 6-24: "...because biological mixing processes measured at the Site (and incorporated into the predictive model) are also taken to extend to a depth of one foot, surface mixing associated with prop wash would have no net effect on the effectiveness of MNR in this setting." This statement is false because prop wash could resuspend contaminated sediment and transport it elsewhere.

Section 6.2.3.1, page 6-34: "Swan Island Lagoon is a quiescent area where the main limitation for potential natural recovery is lack of sedimentation. Thus, augmentation of sedimentation rates via EMNR would likely be highly effective here." NOAA disagrees with this interpretation. Another important limitation here is potential future dredging, which would reverse the effect of EMNR. See also page 7-7 which suggests EMNR in Swan Island Lagoon. What does the property owner plan to do with respect to dredging?

On the other hand, the opposite argument is used for river mile 11-11.8: it "has significant areas of historical deposition as indicated by measured bathymetry changes ... and thus EMNR may be effective in specific areas in this river mile." Given that there is already sedimentation occurring as indicated by bathymetry, and yet surface/subsurface concentration ratios are still high, this indicates there may be ongoing sources and/or mixing occurring, and thus it seems *unlikely* that adding more sediment would prove effective.

Section 6.2.3.1, page 6-35: Given that Category 2 areas should be considered uncertain for MNR, these should be evaluated here, too (i.e. river mile 5-7). This area has more sediment transport occurring so material placed here is likely to be mobilized.

Section 6.2.4.1.2, page 6-40, bullet #3: "All of the delivered AC remained in place throughout the post-placement monitoring period."

This is not accurate, according to the Activated Carbon Pilot Study Construction Documentation Report (2007) which states "on average, approximately 30 to 50 percent of the activated carbon mass applied to the Grasse River surface sediments was recovered in post-application samples using the BC-C technique...Small-scale spatial variability in the application of activated carbon is likely a significant contributing factor to the observation of unaccounted mass identified through the post application sampling results."

NOAA commented on that report that we agree that the small-scale variability contributes to the lack of closure on the mass balance, but being able to account for only 30-50% of the

mass of a material added to the river, in conjunction with not finding AC in sediment at depths greater than 3 inches, strongly suggests that AC was carried away from the test site. If AC is proposed for use at Portland Harbor, a pilot study to assess placement techniques would be needed.

Section 6.2.7.3, page 6-67 (Also see general comment above): The draft FS argues against the use of silt curtains and sheetpile walls as dredge BMPs, but for the following reasons, NOAA believes that silt curtains and sheetpile walls should be retained as options for remedial design in order to facilitate dredging in areas of higher contaminant concentrations.

1. Containment devices such as sheetpile walls and silt curtains will limit the spread of dredge residuals, thus enabling higher production rates and decreasing the total time needed to reach cleanup goals while minimizing adverse impacts to biota. Effective containment of contamination during dredging may allow dredging to occur outside the fish window, further accelerating the pace of cleanup.
2. The objections raised in the draft FS to the use of sheetpile walls and silt curtains can be overcome.
  - The draft FS predicts that high flow and scour near silt curtains will decrease their effectiveness: "Dissolved phase and particle bound PCBs were found to have migrated beyond the containment" because the "concentrated flow conditions beneath the silt curtains resulted in localized scour and resuspension" at Grasse River and the "double silt curtain system was abandoned after being determined to be ineffective due to variable current speed and direction" at Massena. Flow conditions on these rivers are not necessarily the same as those in potential dredging footprints at Portland Harbor. Most of the areas in Portland Harbor with high contaminant concentrations (i.e. the areas most likely to be dredged) are near the riverbanks and thus have lower current speeds and a lower probability of release.
  - The draft FS predicts problems with stability of sheetpile walls due to scour. This can likely be overcome: for the dredging project on the Passaic River, flow modeling was conducted to determine likelihood of scour, and concrete pads were placed around the walls to prevent scour and stabilize the walls. Similar methods could be used at Portland Harbor if needed.
  - The draft FS describes the potential for silt curtains and sheetpile to obstruct boat traffic. This impact will depend on the location of the containment devices with respect to the navigation channel and should be minimal at Portland Harbor. The silt curtain used on the Hudson River was placed across the entire river channel and had to be opened frequently to allow boat traffic, but at Portland Harbor this could be avoided, as the areas to be dredged are near the riverbanks and are small enough to

allow temporary isolation from the rest of the river (i.e. boats could go around without requiring the curtains to be moved).

- The draft FS predicts difficulties with installing sheetpile amidst riverbed debris. A recent dredging project on the Passaic River successfully placed sheetpile in an area of large heavy debris pieces including discarded appliances, demonstrating that it can be done. They conducted reconnaissance using side-scan sonar to help with placement.
- The draft FS describes the potential for installation or removal of sheetpile to release contaminants. This can be ameliorated by placing the sheetpile farther out around the boundary of contamination.
- The draft FS describes the potential for contamination to leak out through gaps in a sheetpile barrier and cites Hudson River as an example of leakage problems. The containment at Hudson River, while imperfect, was better than no containment at all, and the EPA review of *Hudson River's Phase 1 Operations* (<http://hudsondredgingdata.com/documents/pdf/EPA%20Oversight%20Report%20Final.pdf>) concluded that containment should continue to be used. Acknowledging the possibility of leaks, monitoring should be conducted during dredging to evaluate the effectiveness of containment devices.

Section 7.3.2, page 7-7: Because some areas are already below the likely remedial goals, “It should not be assumed that MNR is a necessity in all areas of the Site-wide AOPC, although for the purposes of this draft FS, MNR is assessed throughout the Site.” Site-wide monitoring will still be necessary to see whether contamination is being redistributed around the Site and to assess exposures for receptors that use a broad area of the river.

Figure 8.2.2-1: More clarity is needed regarding sequencing assumptions. Explain why concentrations do not decrease as quickly under Alternative F compared to other alternatives. Alternative F would be more effective if it targeted the same areas as the other alternatives for the first ~10 yrs and then continued to clean up additional areas. In general, the most contaminated areas should be addressed first in any cleanup alternative.

Section 8.2.2.4, page 8-15: Increases in fish tissue concentrations are temporary (see Fox River and Hudson River results, which saw elevated concentrations for one year and then an improvement). These should not be cited as a reason not to dredge.

Section 8.2.6.1, page 8-32: Please check the arithmetic for worker injuries since the number of hours is stated once as two hundred thousand and once as two hundred million. Two hundred million worker hours does not seem plausible and is presumably a typographical error. Also please explain how the number of work hours is derived (what assumptions were made about the number of personnel, etc.). Given the assumptions in section 7.5 (working

105 days per year during the fish window, 12 hours/day, 6 days/wk), 200,000 worker hours per year implies about 160 construction workers all working overtime (or the equivalent of 286 fulltime workers). Is that what is envisioned?

Section 9.1.1, page 9-3: “In Swan Island Lagoon, all of the action alternatives are estimated to attain similar long-term surface sediment PCB concentrations in the range of approximately 60 to 110 ppb.” Does this include the proposed CDF or CAD cell in Swan Island Lagoon?

Section 10.3.1, page 10-13: “Because of regional background conditions, fish consumption advisories for resident species are expected to remain in effect at the Site irrespective of which alternative is selected.” Fish consumption advisories are a de facto injury to natural resources under CERCLA, so some primary restoration should be conducted with the aim of contributing to the removal of these advisories.

Figure 10.3-1: It is not accurate to call an area “remediated” if what was done there was to build a CAD or CDF. These structures reduce exposure risk, but they also preclude future uses of natural resources.

Appendix A, page 2: Upper Confidence Limits (UCLs) and Upper Prediction Limits (UPLs): Typically we use the UCL to provide conservatism in comparing the UCL on the mean of site samples to an established threshold value. Using the UCL to set the threshold value will bias the threshold value high. If it is used to set the background level, then one would have to use the UCL of onsite data to provide a fair comparison. This begs the question of how to group the onsite samples for computing the UCL(s): By river mile? Over a range of samples such that the variance is comparable to the variance in the background data? It is not clear how this would be done.

Appendix A, page 5: Preliminary remediation goals below background will “likely not be used for remedial decisions”. This depends how background is defined and should take into account the PCB deposit just upstream of the Site. That deposit should not be used to artificially inflate “background”.

Appendix E 4.7, page 29: Add explanation of the derivation of the UPL: “EPA’s chosen statistic of 17” ppb.

Appendix Ha 4.1.2.3, page 65: Sensitivity analysis found that the model was not very sensitive to the magnitude of National Pollutant Discharge Elimination System (NPDES) loadings, with exceptions in the immediate vicinity of the discharge locations. Thus in most cases the model predictions can be used, but if MNR is proposed at or near NPDES discharge for copper or BaP, then the use of this sensitivity run must be evaluated. (This applies to section 6.2.2.1.3 evaluating the likelihood of success of MNR.)

Appendix La 2.3.2.3, page 17: Equation 2-29 gives the erosion rate based on shear stress. How does Equation 2-30 relate (i.e. when do we use it)?

Appendix La 2.3.2.3, page 17: Refers to Figure 2-17. Particle diameters in text do not match those shown in figure.

Appendix La 2.3.4, page 35: Erodibility parameters are averaged over the whole Site for cohesive bed areas. Therefore, in the places with above average erodibility (i.e. in about half the cores, and in areas of the river with similar bed characteristics to these cores), the model will erroneously predict no erosion at some times. Table 2-6 shows that the critical shear stress ranges from 0.09 to 0.73 with an average value of 0.30.

Appendix La, Table 2-13: Why would we omit 2002-03 data rather than averaging it in with the other data? It is likely that we may have similar “anomalous” periods in the future.

Appendix La, Figure 2-75: The method of calculating the statistics of the absolute difference in net sedimentation rate is not appropriate. Using this method, over-predictions and under-predictions cancel out so it cannot show how accurate the model predictions were, only whether they had an overall bias. Instead, after step 1, generate a third data set which is the absolute value of the difference between the predicted and measured value in each zone. Then take the mean of that data set. That will estimate how well the model matches the measured sedimentation on a given spatial scale.

Appendix La 2.3.6, page 41: “The first step in this evaluation was determining qualitative agreement between erosion and deposition areas (e.g., if the model predicts net deposition in a specific grid cell, is the prediction consistent with the data-based bed elevation change?).” Table 2-15 suggests that 2.5 cm/yr was used as the criterion for “qualitative agreement”. This is a large margin given that the criterion in Section 6.2 for categorizing an area as “likely to recover” (Category 3) was  $>1$  cm/yr of sedimentation. If the model accuracy is  $\sim 2.5$  cm/yr, then an area classified as Category 3 may actually be experiencing net erosion of 1.5 cm/yr. This is the main problem with the sediment modeling. The approach is acceptable, and the accuracy may be as good as any model could possibly be, given uncertainty on all the inputs and measurements, but it’s overly optimistic to use it to try to give a sedimentation rate to within 1 cm/yr.

Appendix La, Figure 2-79: This figure should be corrected to match the text on page 46 or else vice versa. The runs listed in the text (7, 11, 12, 26) are not the ones shown here (7, 9, 12, 26).

Again, NOAA appreciates the opportunity to provide these comments. I am perfectly willing to assemble the NOAA team to discuss these comments further. Please let me know if you have any questions.

Sincerely,

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